Space Weather Forecast

Issued on Saturday, 24 June 2023 at 01:14 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor/Moderate R1/R2 radio blackouts throughout. Slight chance of Minor G1 geomagnetic storm to start and especially to end the four days.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been moderate in the last 24 hours, with the falling limb of a peak mid-ranking Moderate-class X-ray flare immediately prior to the start of this reporting period (emitted from the ongoing most active sunspot in the southeast at 22/2344UTC).

There are currently eleven sunspot regions on the facing side of the Sun. The most active, mentioned above, still appears relative simple magnetically and appears stable, with no changes visible on the 'surface'. The largest group, meanwhile, remains in the north centre of the Sun, with a spreading tendency visible. There was also some reconfiguration in a further three sunspot regions, but with no significant areal change and little accompanying flare activity. The remaining spots showed little change.

The 'filament' (arc of plasma) mentioned immediately to the east of the most active sunspot group in recent guidance lifted off with the sunspot region's Mdoerate-class X-ray flare of 22/2344UTC. In part because of observing satellite manoeuvres and also because the bulk of the Coronal Mass Ejection (CME) is partly obscured by the mirror mount for the observing instrument, analysis has proven difficult. Having said this, a reasonable match for modelling was obtained.

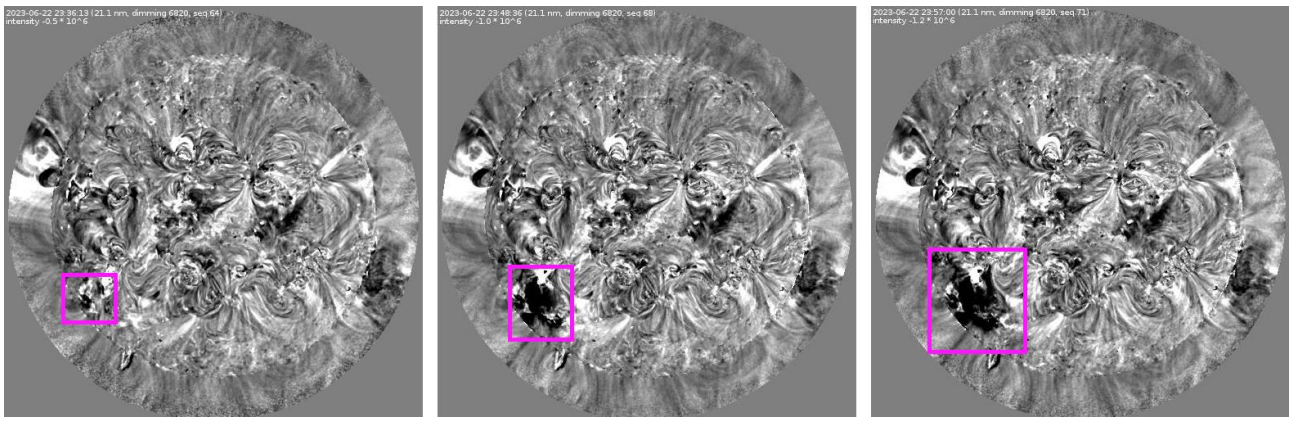

Figure 1: SIDC ROB-processed AIA211 time-integrated dimming of the M4.8 flare and filament eruption from AR3341 at 22/2344UTC. This has been determined to possibly deliver a glancing blow of Earth around the turn of the UTC day of 26 into 27 June.

Satellite imagery for the past 24 hours is dominated by the aforementioned Moderate-class flare and southeast-heading filament. This has been modelled using limited imagery but shows as a possible glancing blow around the turn of the UTC day late 26 June, (or more likely) into early 27

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June.

Solar Wind / Geomagnetic Activity: The solar wind showed a declining but then resurgent connection to a 'coronal hole' high speed stream. The precise source remains uncertain.

Solar wind speeds have remained mainly slightly elevated. The number of particles in the solar wind has been within typical background levels, but with a slight fall observed as the speed rose. The associated magnetic field initially followed a steady trend at background before increasing slightly, with the north-south component erratic but smaller in magnitude.

The net result of the above solar wind measures was for provisionally mainly quiet geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms have been observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity carries a chance of returning to Moderate, with isolated Moderate-class flares most likely from the most active sunspot region, as in recent days.

Solar Wind / Geomagnetic Activity: Both the CME and fast wind parts of the forecast are relatively intertwined in the coming days.

A glance from the 20 June CME may combine with an expected slightly enhanced solar wind currently observed by a satellite around half a day upstream of Earth. These may give a slight chance of Minor Geomagnetic Storm G1. Activity should be more reliably Quiet later in the UTC weekend and at first in the new working week, however the 22 June Moderate-class filament CME may also glance Earth late on 26 or more likely into early 27 June to give a second peak slight chance of G1, with this too perhaps riding on an enhancement from a density increase ahead of a minor fast wind stream.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, although there is a slowly increasing daily slight chance of S1 or greater.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	1	10	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	50	50	50	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	10	10	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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